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IDEA 0112-68
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16 February 1968

MEMORANDUM FOR THE RECORD

SUBJECT: [REDACTED] Program

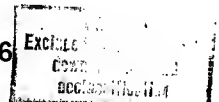
This program was authorized for the purpose of determining crop yields and performing soil assessment analysis through the use of aerial photography of selected agricultural areas.

OSA was first briefed on this project on 22 August 1966, by [REDACTED] ORD. At that time three high altitude sorties were requested to cover areas of sugar cane and rice near Thibodeaux and Crowley, Louisiana, and a wheat crop area near Denver, Colorado. Prior to this time low level photography had been obtained and studies made to determine the feasibility of estimating crop yields from aerial photos. For the high altitude U-2 flights a special camera was used which was provided by [REDACTED]. The main drawback was the fact that only ten seconds of film running time was available due to the meager amount of the special film available. The flight over the selected area near Denver was flown satisfactorily on 30 August. On 1 September the first flight was flown over the Louisiana areas. On 28 September and 25 October the Louisiana crop areas were covered again which fulfilled the 1966 requirements for a three time coverage of the selected areas. All flights were round robin sorties out of [REDACTED].

1967

1. General: A meeting was held in April 1967 to outline the test program for this year. At that time the responsibilities for accomplishing this task were assigned. ORD had overall responsibility for the entire project. [REDACTED] was given the responsibility for providing cameras, loading and unloading, and performing preflight. [REDACTED] would also develop, process, and P.I. the film and estimate crop yield. OSA would handle the flight scheduling and coordination. North Dakota was selected as the primary area for the [REDACTED] tests. Interest in crop estimate was centered on wheat for this year. A one time look was planned for the selected site near Denver which was covered in 1966. The schedule called for photography coverage once a month from

SECRET



May through August. This would cover seedling survival, general vigor, post-heading assessment, pre-harvest assessment and post-harvest assessment respectively. Other factors such as disease, lodging and weed infestation were to be evaluated for their affect in the estimates.

2. Cameras: Two types of special camera were planned for use this year. A pair of 12 inch focal length HYAC cameras developed by [redacted] plus four 3 inch focal length English Vinton reconnaissance cameras were used on each flight. The swath width using the HYACs was approximately 24 nautical miles. For the Vintons, swath width was about six nautical miles. Due to delay in delivery of the Vinton cameras from England, the first sortie was not flown until 14 July.

25X1A

3. 1967 [redacted] Sorties:

a. The first flight was on 14 July. This covered the Denver and North Dakota areas successfully.

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b. On 25 July the film broke during flight thus this mission was unsuccessful. [redacted] ORD, made a trip to the West Coast after this flight and personally emphasized the importance of a proper pre-flight of the equipment by the [redacted] representatives. No further camera incidents occurred this year.

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c. During August and September a total of six sorties were flown in support of this program. The last flight was on 28 September. A total of eight sorties were flown in support of the 1967 [redacted] program of which seven were successful.

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4. Yield Estimates:

a. Following are [redacted] estimates for the 1967 wheat yeild for North Dakota.

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DATE	ALL WHEAT AVERAGE	ALL WHEAT PRODUCTION (bushels)	
Oct 1967	5,640,391	151,711,438	Raw Data Estimate
13 Dec 1967	7,185,730	166,202,159	Revision I
18 Dec 1967	7,272,146	174,147,661	Revision II
Jan 1968	7,448,516	176,195,376	
Feb 1968		171,999,000*	

* Based on $\frac{1}{2}$ of 1% sample of the entire state.

IDEALIST

IDEA 0112-68

Page 3

b. The United States Department of Agriculture (USDA) figures, based on actual count and calculations, estimate a yield of 176,826,000 bushels of wheat. These figures were published in December 1967. Final figures will not be available until May 1968. The February 1968 [] estimate is within 2% of the December 1967 USDA figures.

c. The initial [] estimate was based on photo interpretation using the six mile swath width of the Vinton camera. Obviously, this was not taking in a large enough representative area as the figures obtained were lower than the 1966 yield. The 1967 acreage had been increased over that planted in 1966. Revisions incorporated the procedure of photo interpretation using the 24 mile swath width HYAC cameras which produced more realistic figures in small acreage areas. Because of the narrow swath width of the Vinton camera, a true evaluation was not possible as unproductive areas such as topography, soil zones, lakes, etc., were reducing the percent of tillable land excessively in small wheat areas. An increased number of sample points was then included. Use of the panoramic camera Ektachrome Infrared imagery obtained from the HYACs permitted a better estimate of yield in areas that had appeared low. Consideration also had to be given in estimating variable wheat yields within each county based on historical data. One problem still to be solved is the development of reliable signature characteristics to identify wheat from other small grain crops. [] production estimates are continuing by further film analysis with particular emphasis being placed on use of the 24 mile swath width film.

1968 Proposed Program

1. 1968 Flight Schedule:

a. Further flights are projected for the North Dakota area but on a reduced number. These flights will serve to further validate the procedures used in 1967 and lend additional credence to the applied methods in arriving at the estimates. A minimum of four flights are projected.

b. Since rice is one of the other major crops produced in the world, it is proposed to expand these studies into that area outside the United States. An

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estimated 12 flights will be required to obtain the desired coverage between June 1968 and June 1969.

[] is the presently selected country for the rice studies provided proper approval is given.

2. Camera Systems: Basically the same camera systems will be utilized. For the Vinton cameras, a high quality four inch focal length lens will be substituted for the previous three inch lens. This will provide better scale and resolution. Both black and white film and [] will be used since they have the desirable features in them to obtain maximum photo interpretation information used in the estimates.

3. Summary: No problems are envisioned in the support of this program. [] will have representatives in the field to maintain preflight, load and unload cameras and will be sufficiently informed of the program to assist in flight coordination. Processing of black and white film would be accomplished at the overseas detachment. This would serve to determine at an early date whether a reflight might be desirable, thus eliminating excessive delay in obtaining the flight results.



Chief, IDEALIST Division, O/OSA

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